RX7 IDC tracking water injection system

HFS-6 osa

User manual

with IDC Summer wiring diagram

GETTING TO KNOW THE AQUAMIST HFS-6 osa

Aquamist has been pioneering the IDC based water injection system since 2003 with great success. The HFS-6 now offers "user re-scaling" and "manifold pressure compensation" adjustment. This new capability sets a new level to the concept of WAI system to date. .

The concept behind the HF5-6 osa (open source architecture) design is somewhat unusual in many ways in the key-tapping digital age. It goes one step beyond the current cell by cell on-screen programming via a lap top. The only tool needed is a small screw driver. User can define the entire flow curve by manipulating five onboard trimmer potentiometers. Each trimmer is pre-programmed with a mathematical formula to simplify the flow mapping work.

The wiring task has also been revamped to cut installation time. Three dedicated colour coded, pre-terminated wiring harnesses are allocated for each area of the car, covering the engine bay, ECU and water tank/pump in the trunk. Continuing the same tradition of constant water pressure and fluid flow is controlled by newly designed inline high speed valve. This new valve is necessary to handle the new line pressure of 160psi, risen from the previous pressure of 125psi.

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Checking the contents of the box carefully

This is a "must do" immediately after unpacking ....

Water pump

Unpack the corrugated sheet carefully. The pump should be labelled with the original custom Aquatec/ Aquamist logo. Model number: 58832P0D-B664AM

The white box

- 6M of 6mm OD nylon hose (806-261)
- 2M of 4mm OD nylon hose (806-266)
- 15A Fused water pump harness with 40A relay
- 75mm stainless hose clip and support bracket
- HFS-6 Flow Control Module with 2.5M of red capped RJ45 connector harness.
- 0.8 mm water jet (806-323) in plastic bag
- 0.9 mm water jet (806-324) in plastic bag
- 1.0 mm water jet (806-325) in plastic bag
- 1x 4mm Y-piece (806-362) in plastic bag
- 2x M8 x 1/8 NPT jet adapter with plug (806-357N)
- A set of three restrictors with threaded tool
- 1x water tank adapter 1/8 BSP (806-270) + 6mm qck-fit elbow (806-376)
- 100 micron inline water filter (806-257)
- 4x M5x 40mm, nuts, washers and fasteners for pump
- 1x M6 grounding stud with washed and nuts and 6mm eyelet for pump ground
- 5-port brass manifold with 3/8BSP adapter. 3x blanking plugs, 1x 3/8 BSP-M to 1/8BSP-F adaptor 2x 6mm 1/8BSP-M elbow.
- 1x 22cc surge arrestor/accumulator (806-409)
- Water pump harness. 6M of #12 AWG cable and 6M of multicore cable with blue RJ45.
- HFS-6 controller box
- 1x water level switch with connector (806-280c)
- 1x DDS3 Dash Gauge with 1.5 M x 8-way cable
- 2M of multicore with yellow capped RJ45 for ECU interface, fail-safe and Map switching.
- User manual

Note: Please contact your supplier immediately should you discover any missing parts.

Getting started on installation

Before installation guidelines

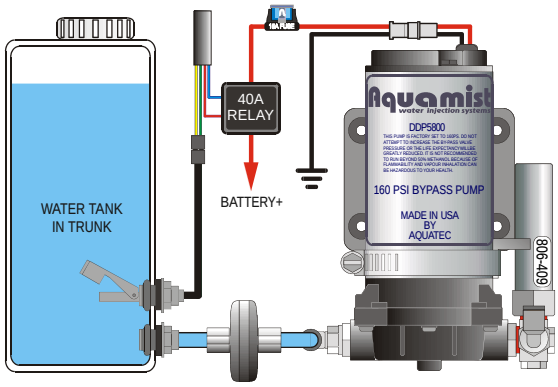
- The pump and water tank are designed to be fitted in the trunk. Install the water pump and inline filter below the water tank.
- Ensure all fittings are tightened and leak proof before filling up with methanol, **test it with water first.** If high concentration of methanol is used, please vent the tank's breather hole externally. Methanol is poisonous at high concentrations.

Assembling the pump in steps

- Gently assemble the two 3/8 BSP adapters into the pump without crossing the threads. The female one goes into the inlet of the pump. Flow direction is moulded onto the plastic pump head. Ensure o-ring is properly seated.
- Ensure the accumulator lies horizontally after final tightening (relative to the pump length).
- Assemble the accumulator supporting bracket with the metal band supplied.
- Assemble the rest of the 1/8 BSP elbow fittings and blanking plugs. Ensure all o-ring type fittings are not overly tightened.
- Mark (smear dye on to the pump's rubber feet) and drill four holes for the pump.

Water tank components

- Ensure the outlet is facing the rear or the side of the tank. Drill/bore a burr-free 23mm hole. Clear up all the burred edges and wash the tank thoroughly. No debris or plastic shaving should remain in the delivery system. 1-2 inch from the bottom of the tank is ideal. Don't over tighten.
- Same hole size for the water level sensor. IF using a washer tank for supply, do not locate the Aquamist float sensor near the stock washer pump.. The float should swing upwards.
- A tall and slim water tank is ideal for this type of application. This minimises delivery surge problems at low water level.



Installation for long-term reliability

This is the most important section of the HFS-6 chapter. Please do not skip reading this part.

52mm Dash Gauge:

Location is not too critical as long as it is in view of the driver. There aren't too many pitfall on this.

HFS-6 controller box:

Please locate the box in a dry location in the pass compartment. Near a glove box is whats been found to be best. Please route the wiring and secure loosely so that tuning and diagnostics can be made without too much dis assembly in order to gain easy access = its been found by professional installers and advanced users that it would be nice to hold the box in the hand while sitting in the front passenger seat when tuning or diagnosing.

Flow Control Module (FCM):

The location of this module is most critical to overall system reliability. It is designed to be installed in the engine compartment.

This module must be installed in a cool and dry area, well away from the heat source. Bulkhead/fire wall is not a good location as most heat is flowing towards it during driving. Avoid location near any electromagnetic components such as the ignition coil, solenoid valves and electronic motors. It is very important that the hose is cut cleanly with a razor blade to retain the "roundness". Side cutter produces a semi-round hose end, major leak will result sooner or later. It is also vital that the hose must be cut be perpendicularly relative to this length. This is because the compression has a short hosetail, an accurate cut will allow maximum grip on the walls of the hose.

The ground tag must make a good electrical contact to the chassis ground. Smear some grease on the junction to protect it from moisture.

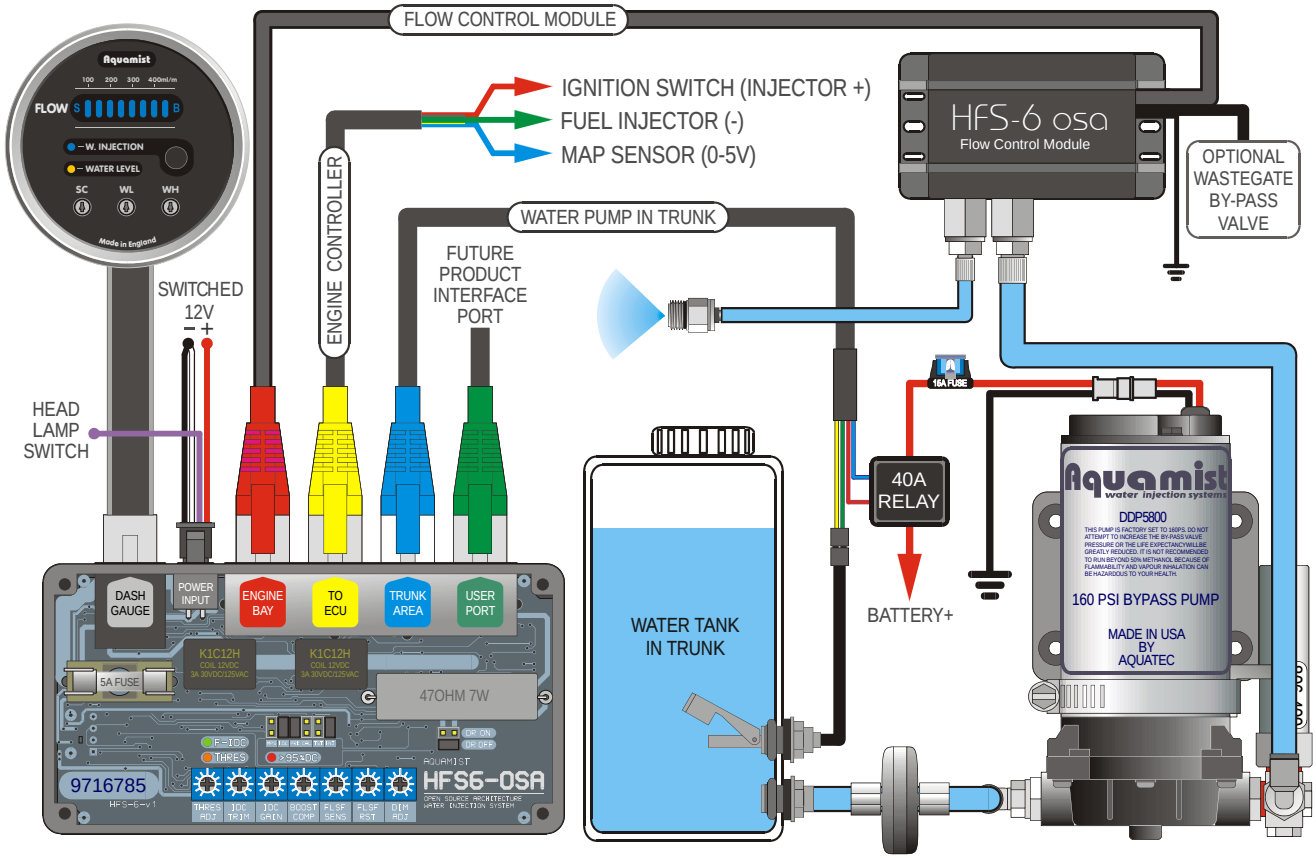
8-feet of two-core cable from the FCM is intended for fail-safe purposes. It activates a low-power 3-way solenoid valve to by-pass boost pressure to the wastegate. In the event of a fail-safe activation, it will lower the boost down to the mechanical fail-safe setting. This option is normally intended for use with a manual boost controller and some stepper-motor based electronics boost controller.

The Tank level sensor:

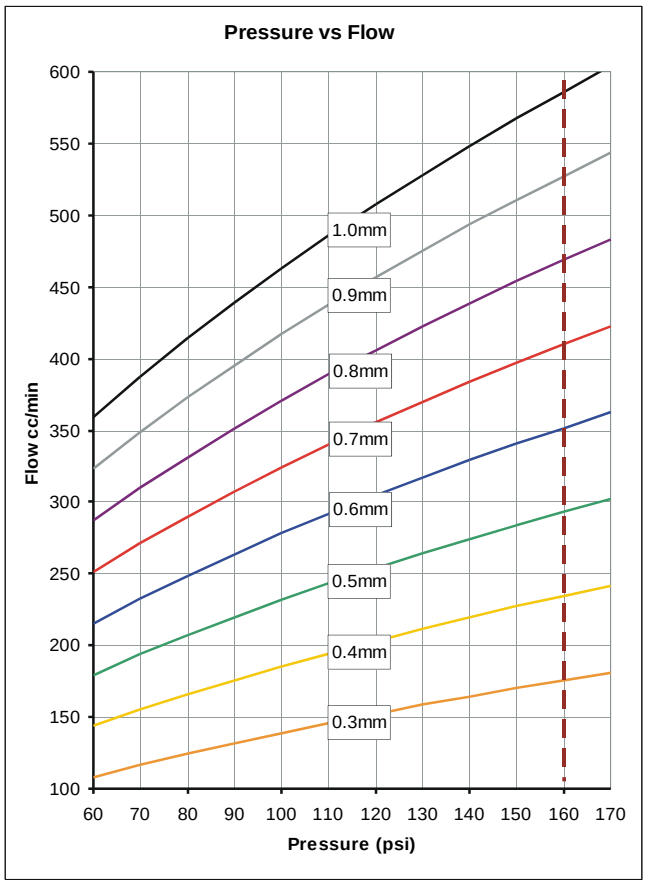
Check there is ample room of the sensor arm to swing before drilling. If stock washer tank is going to be used, do not mount float near stock washer pump. The motor magnet will affect the sensor to read properly. The sensor can be installed 3/4 way down the tank, Preferably at the rear facing wall of the tank. A 23mm burr-free hole must be used to ensure good seal. Never over tighten or the seal will split, just tight enough to prevent leakage, no more.

Generic wiring diagram

(go to page 22 for RX7 specific diagram)



Choosing jet sizes



This is a general guide only:

- 100% water: run 10-15% water/fuel ratio.
- 50:50 methanol/water, run 15-20% to fuel.
- 100% methanol, run 20-25% to fuel

Choosing the jet by calculation:

First work out the total fuel flow by adding up the capacity of the fuel injectors. Multiply the result by the preferred % recommended above.

Pick the nearest jet/jets size to match the flow. Don't forget to subtract the boost pressure from the line pressure of 160psi. For example, if you are boosting 25psi, you should select the jet flow at 135 psi.

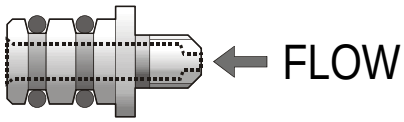
Once the jet/jets and flow are determined, insert the nearest HSV restrictor to regulate the fluid flow so the delivery will be linear to the duty cycle.

JET	60	70	80	90	100	110	120	130	140	150	160	170 PSI
0.3	108	116	124	132	139	146	152	158	164	170	176	181
0.4	144	155	166	176	185	194	203	211	219	227	234	242
0.5	194	207	220	232	243	254	264	274	284	293	302	179
0.6	215	233	249	264	278	292	305	317	329	340	352	362
0.7	251	271	290	308	324	340	355	370	384	397	410	423
0.8	287	310	332	352	371	389	406	423	439	454	469	483
0.9	323	349	373	396	417	437	457	475	493	511	527	544
1.0	359	388	414	440	463	486	508	528	548	567	586	604

FLOW RATE: CC/MIN

The HFS-6 is supplied with a set of high-flow water jets, sized at 0.8, 0.9 and 1.0mm (see chart for flow rate). A Y-piece is supplied with the kit for twin jet applications. There are two nickel plated brass jet adapters (1/8 NPT). The tapping hole should be 11/32" or 8.8mm. Do not over tap. Clean the mating part with alcohol first, Trial fit before loctiting into position.

Three restrictors are supplied for duty cycle/ flow matching should good linearity be required. For flow greater than 1100cc/min you can omit it. It should be fitted inside the inlet port fitting of the Flow Control Module (FCM).



Remove the inlet fitting first from the FCM. Use the threaded insertion tool to push the restrictor in position, Apply a smear of grease to avoid damaging the o-ring.

0.5mm restrictor ..... 0 - 380cc/min
0.7mm restrictor ..... 0 - 680cc/min
0.9mm restrictor ..... 0 - 1080cc/min

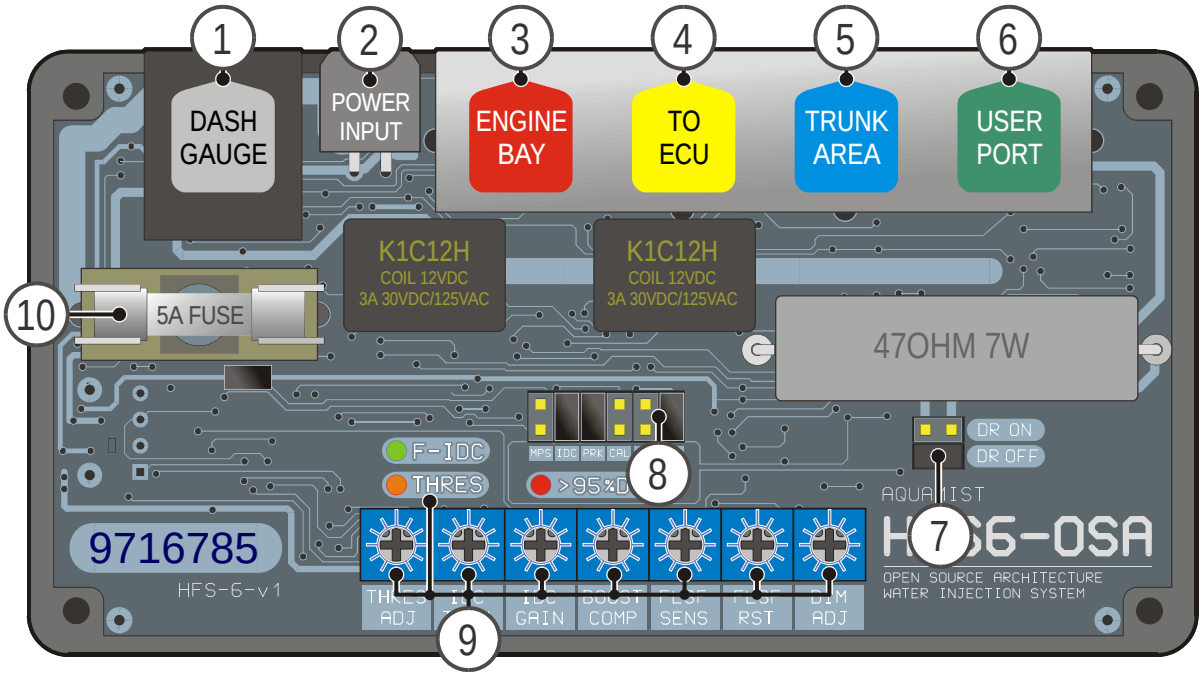
Applications involving methanol mix beyond 50%:

Great care and attention must be taken to ensure the fluid tank is capable of handling methanol and is designed for this type of application. These tanks are normally termed as a Fuel cell and are available from most reputable racing parts suppliers. Anti-surge foam should be used for circuit racing. Follow the maker's guidelines carefully.
The breather hole must be vented externally with a suitable hose. All fluid delivery hoses and fittings must be free of all leaks. Ensure the area is well ventilated and isolated from the driver's compartment. Take whatever measures to avoid any methanol fumes building up in trunk area.

Methanol is highly flammable. The main delivery hose to the engine bay should be routed underneath the car. Ensure it is securely clipped and fastened. Avoid kinks, close proximity of moving parts and heat producing components. Please treat this recommendation seriously. If in doubt, ask advice from a professional person familiar with this kind of application. DO NOT take any undue risks. It is recommended that a suitable fire extinguisher is placed within easy reach of the driver. All electrical connections must be properly tightened to avoid spark production.

Warning: Prolonged use of 100% methanol may cause premature pump failure and may not be covered under warranty.

HFS-6 function directory



1. DASH GAUGE (P.15)
2. 12V, HEAD LIGHT SWITCH and GROUND (P.7)
3. FLOW CONTROL MODULE in ENGINE BAY (P.7)
4. ENGINE MANAGEMENT and FAIL-SAFE (P.18)
5. WATER TANK and PUMP in TRUNK AREA (P.7)
6. FUTURE PRODUCT INTERFACE (P.7)
7. DUMMY LOAD RESISTOR for ANTI-CEL (P.18)
8. SYSTEM CONFIGURATION BY USER (P.13-14)
9. FLOW and FAILSAFE POTENTIOMETERS (P13-14)
10. 5A 20mm x 5mm FUSE LINK

Mechanical work (checklist):
Only after testing with distilled water should methanol be used. BEFORE hooking up line to the jet the system should be manually ativated to flush any possibly dirt/disturbis from the lines.

Wiring work (checklist):
The HFS-6 is pre-configured from factory, just requires the following connections to get to work.

1. 4-way Power-in connector:
- Red ..... Switched 12V (IGN SW#2)
- Black ..... Chassis ground
- White ..... Chassis ground
- Purple ..... Head lamp switch (optional)

2. Signal to the yellow RJ45 connector:
- Red ..... Ignition switched 12V
- Green ..... Fuel injector (-) pin
- Blue .....MAP sensor (optional)

Power-up procedure:
Please follow this procedure "strictly" or permanent damage to the system may result.

Do not skip any steps please....
1. Ignition key on the "OFF" or "0" position:
- Dash Gauge is plugged in and switched on.
- All the RJ45 plugged are colour matched.
- 4-way plug is engaged into the socket.
- No leds should be lit anywhere.

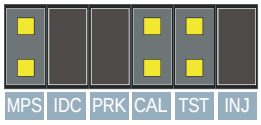
2. Ignition key on the "ACC" or "#1" position:
Absolutely no change, same as the above conditions.

3. Ignition key on the "pre-cranking" or "#2" position:
- Do not crank. Observe the gauge and controller leds
- Yellow led on the gauge will stay lit for 5-10s before the rest of the gauge lights up.
- "S" and "W.INJ" led should be lit on the gauge.
- All the green leds on the HFS-6 controller should be lit with the exception of the green connector.

3. Start the engine and let it idle for a minute or so:
- The green led on the controller should flicker
- The yellow led on the "green" and "yellow" RJ Connector socket should flicker.
- Flicker should speed up with engine speed.
- If the system behaves as stated above, you have successfully wired up the HFS-6!

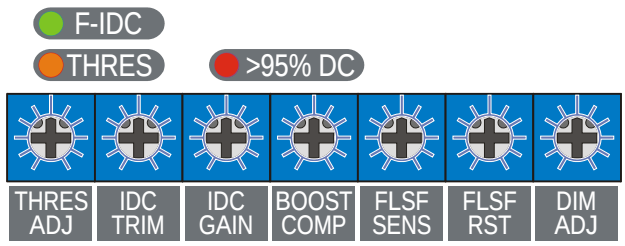
The next stage will be testing the system manually by using the jumpers links on the controller board. You will need a small 3/32"slotted screw driver. .

Testing the controller functions:

1. Gauge Bargraph test:


Taking the parked "PRK" link and place it on the "CAL slot", you should see 4-5 bars lights up. Twiddle the "SC" trimmer on the gauge will yield more or less bars. Clockwise to reduce bars. Reinstate the "SC" back to 12 o'clock. Make sure "IDC" is selected.

2. Simulating 100% injection test:
Remove the link and put it on the "TST" slot momentarily and observe:
- Amber led on the controller board will light up.
- Red led on the controller board also lights up.
- The yellow should light up except for the blue RJ connector,
- The water pump will start.
- There should be full spray on the jet instantly unless the system is not fully primed. Allow a few seconds for the water to reach the jet. For longer hose run installations, remove the jet first to allow faster priming.
- Remove the link and put it back to the "PRK" position before you empty the water tank. If all is well, move to the next test stage.

3. Testing the IDC detection function:


This test confirms the system is detecting the IDC signal correctly. Set the "THRES-ADJ" trimmed to minimum (full counter-clockwise). At this setting (12% IDC), the system should trigger with a quick blip of the throttle (provided you don't use very large fuel injectors). Keep the trimmer in the same position.

4. Take the car for a test drive:
Eyes fixed on the road and water jet (on screen), find a stretch of road where you can use full throttle. Do a few quick burst of full throttle runs and see if the spray is progressive with each acceleration run. The volume seen at the spray should coincide with the bargraph readings on the dash gauge.

This concludes the test session of the HFS-6.

Advanced flow management trim

The HFS-6 is designed to allow the user to manipulate the two main signals received from the fuel injector and the MAP sensor. This is achieved with four trimmer pots. Tweaking of these are not mandatory for initial system testing after a fresh install.

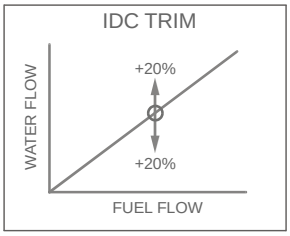
1. "THRES ADJ" (far left):

This sets the triggering point of system based on the fuel injector IDC%. Adjustment range is between 12% to 72%. Mid-point is 42% (12 o'clock)

2. "IDC TRIM" trimmer:

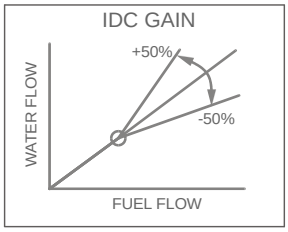
At mid-point, the water flow matches the fuel IDC% exactly. For example, if the triggering point is set to 50% of the Fuel IDC, the DC to the flow valve will also be at 50%.

The trimmer can offset the F-IDC to +/- 20%. This means that one can decrease or increase the water flow relative to the fuel flow. This is useful for trimming water in different ambient temperature and compensating for methanol/water ratio changes.



3. "IDC GAIN" trimmer:

As the previous trimmer does not allow top-end flow increase or decrease when the starting point of the DC% is altered. This potentiometer is designed to address this section of the flow curve.



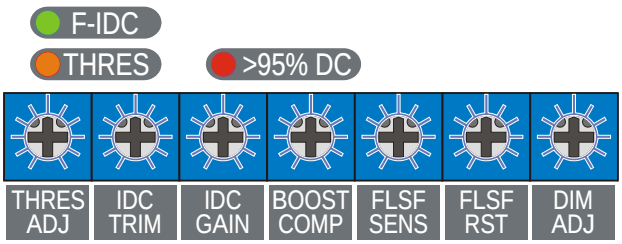
This allows the user to decrease or increase the water flow relative to the fuel flow. This is useful for those who install very large fuel injectors and never use up the full DC.

4. "BOOST COMP" trimmer:

Since the HFS-6 does not reference the system pressure against the manifold pressure changes. This inevitably decreases the water flow during boost periods. This trimmer compensates this shortfall.
0-5V pressure signal is read from the ECU. At Mid point (2.5V), the system will start to add DC (duty cycle) to water flow curve as soon as the manifold pressure signal exceeds 2.5V. The compensation factor is 4% per volt above the trimmer setting. If more boost compensated flow is required, just lower the trimmer setting. A excel based tool is available for download to help visualising the trimmers.
http://www.aquamist.co.uk/HFS6/DUD1.xls

More advanced flow management trim-continued

LEDs to assist visualising the flow curve:



Green led (F-IDC):

Monitors the incoming Fuel injector signal - flicker in time with the engine speed, glows brighter with increase of duty cycle %.

Amber led (THRES):

When the Fuel injector duty reaches the threshold setting of the trimmer, the led lights up solid.

Red led (>95% DC):

When the flow control valve reaches above 95% of it rated flow, this led will lit up.

FAIL-SAFE trimmers explained:

5th and 6th potentiometer from the left allows the user to trim the fail-safe parameters.

FLSF SENS (Fail-Safe Sensitivity):

The "grace" periods before triggering is set to 0.3s from the factory, User can alter these values to suit their driving styles.

FLSF RST (Fail-Safe Reset Timer)

The failsafe automatically reset in 3 seconds (default) after activation. In some circumstances as in rally cars, user requires a faster reset so aggressive map or high boost is restored almost instantly.

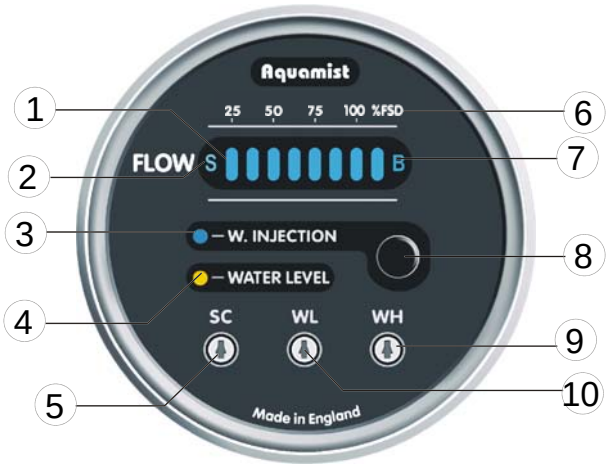
Bigger turbo takes time to spool down especially when a blow-off valve is installed. This calls for a long reset time otherwise the boost can never drop down to the wastegate setting.

This trimmer allows the reset period be adjusted between 1s to 5s.

Automatic Gauge brightness control:

This trimmer works in conjunction with the head lamp switch. When it see a 12V signal. the trimmer becomes active. This coincides with night drive conditions. The high-intensity led used on the dash gauge is too bright for night motoring. So wiring in the "purple wire" from the 4-way power plug to the head lamp switch is essential.

Do not wire it to the car's interior dimming circuit or unexpected results may occur.



1. 8-element Bargraph Display (80-1800ml/min)
Each segment is equivalent to a percentage of the total flow of the sensor scaled by the SC potentiometer.

2. "S" indicates the presence of sensor.
The letter "S" (sensor) must be lit after power up and stay on to show the sensor is functioning correctly.

3. Water injection system ON led
This led comes on the when the system is switched on and in readiness to inject. .

4. Water Level led (yellow)
(This LED has three functions)

a. During "power on delay" period:
This LED will activate for approximate for 10 seconds during the system-on delay before the main system turns on.

b. During normal operation period:
- This LED is on during the fail-safe activation
- Water level low (intermittent flashes)

c. Led lit after the gauge is switched off:
- If the water level sensor is activated for over 20 seconds.
- fail-safe disabled by DHB (p21.6).

5. SC (Sensor Calibration)
20-stepped potentiometer allow user to scale the flow sensor to give an ideal visual indication of a given flow rate. Ideally set the led to display 5-6 bars at full flow.

6. Backlit flow legend
Legend displays % of full scale of 8-bars

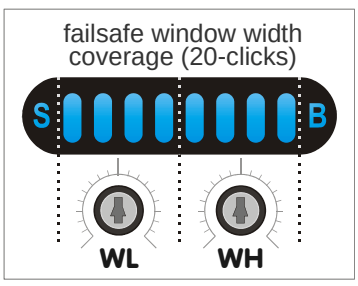
7. "B" Boost Enabled led
When the flow falls inside the fail-safe window after system trigger, this "B" led will activated. Useful indicator of the WL and WH setting.

8. Water injection enable button
Due to extra power level achieved under WI, user may want to reduce the power to the wheels in less than ideal driving conditions. Disabling the WI will reduce boost to wastegate bleed valve setting (if fitted) as well as switching to a less aggressive MAP on custom engine management.

9. Over-range setting potentiometer (WH)
It is just as important to monitor over-range conditions as well as under-range flow conditions. If a leak develops close to the water jet and starves the engine of the water, the user must know this condition. A 20-stepped potentiometer allows accurate and repeatable adjustment range.

10. Under-range setting potentiometer (WL)
This setting can indicate partial blockage and trapped air inside a delivery hose. Again 20-stepped potentiometer is employed. Each click represents a fixed portion of the window width of 8-bars.

WL covers the lower 4 bars and the WH covers the upper 4 bars. Figure on the right illustrates the span of the coverage. Setting is very simple once SC is calibrated.



NOTE:
In order to make the fail-safe adjustment easier, it is recommended to set the bargraph to display 5-6 bars at maximum flow. This way, the fail-safe window can span from the centre outwards.

If the WL and WH is set at 12 O'clock, the fail-safe window is approximately spanned between 2-7 bars. A good starting point.

Minor trimming for the WL is necessary if the water injection trigger point is set to commence earlier.

The gauge will display the activation of the "fail-safe" with two leds:

1. "B" led (right of the bargraph) will not active if the flow is outside the fail-safe window during injection period.

2. The "yellow" led (water level) will activate if the flow is outside the fail-safe window during injection.

As soon as the "fail-safe " is tripped, there will be a 3 second reset period before it resets. If the fail-safe drops boost, user can modify this reset timer. See fail-safe trimmers on page 14.

When gauge is off, expect low boost and safe map unless the board is re- configured. (page 21.B).

This final stage should be quick simple and effective, please read it before proceeding. It will save you time in the long run.

If fluid flow falls inside the fail-safe detection window after triggering, no action will be taken. So setting up the width of the window to accommodate the full fluid flow is vital.

Setting up the fail-safe should only be done after the car has been tuned or the jet/jets sizes are finalised.

Recommended steps to set up the fail-safe

1. Adjust the "SC" to display 5-6 bars at full power.
2. Make a mental note of the number of displayed bars during spool up. Made easier at higher gears.
3. Set the WL to match the number of spool-up bars. It is recommended to allow 2-3 clicks below that point to avoid false triggering. Full span of WL is 20 clicks, covering from 0 bar to 4 bars.
4. Same procedure to set up the WH, allowing 2-3 clicks above 6 bars. Full span of WH is 20 clicks covering 4-8 bars.

This completes the fail-safe setup ...

What steps to take after the failsafe trigger

The most common way to minimise engine damage in the absence of injector is to reducing the boost pressure.

1. For engines with electronic boost control valve:
The yellow harness contains a set of relay contacts that goes open circuit when the fail-safe is triggered. See page 18.2 and 19 for more details.

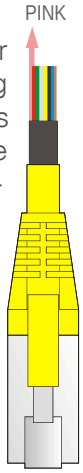
2. For engines with MBC (manual boost controller):
There is a dedicate channel for control a 3-port solenoid valve to by-pass the MBC. Essentially reducing full turbo boost to the wastegate. See page 19 for more details.

3. For engine with map switching capabilities:
The pink wire on the yellow connect has a dedicate output to perform such a task. This pin can be user configured match the signal requirement of the "third party" ECU to switch map. See page 18-1 for more details. This pin is factory configured to give a 5V for "OK" and "0v" is "flow fault"

Maximum current of this output is 5mA.

Alternative to the previous fail-safe configuration, using a third party "by-pass valve" to reduce boost via the FCM (Flow Control Module). There are two more fail-safe channels available from the **"Yellow"** RJ45 connector harness.

1. The Map Switching Channel:



The pink wire from the yellow RJ45 connector is dedicated for the use of MAP Switching when an ECU is equipped with this input. This wire is factory configure to send out a voltage of 4.7 VDC voltage under a "no fault " condition, from idle to full boost. This voltage will switch to 0v upon a fail-safe activation or the gauge is switched off.

Other voltages such as 0v or 7.5V can be user configured - see p.21 for more details. This is by far the most effective method to save your engine from lack of water injection.

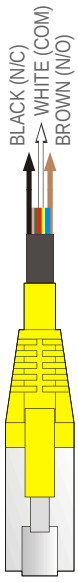
2. Change-over relay contacts:

The HFS-6 has an onboard relay to supply a set of voltage-free, change-over contacts for the sole use of fail-safe activation. It can be used to perform various tasks to save your engine. The contacts are rated up to 1 amp.

Colour code for relay (normal operation):
- White ..... Common contact
- Black ..... Normally closed contact
- Brown ..... Normally opened contact

(state changes upon fail-safe activation or sys off)

Example 1 (most common):
Disabling the OE boost control valve. "Cut and splice" the boost control circuit. "ECU side" to White. "BCV side" to Brown. Need to link the "Anti-CEL" option on page 10.7. Place the jumper link to "DR-ON" (Dummy load resistor). This is only necessary if you want to avoid the onset of CEL during fail-safe activation.



Example 2:
Disabling the third party electronic boost control system. "Cut and splice" the pulsed wire to the BCV, "Controller" side to White and "BCV" side to Brown. It is not necessary to enable the "Dummy load resistor" to avoid a "CEL".

This option will not work with EBC (Electronic Boost controller) utilising a stepper motor to control boost. HKS-EVC is such an example. Use the MAC valve option on page 17.

Upon detection of water flow fault, the HFS-6 can reduce the boost pressure of a MBC to wastegate setting. There is "sealed end" 2-core cable attached to the FCM (Flow Control Module) for this purpose. If you intend to use this fail-safe channel,

The HFS-6 does not include this valve, You need to order one from any distributor of MAC valve USA.

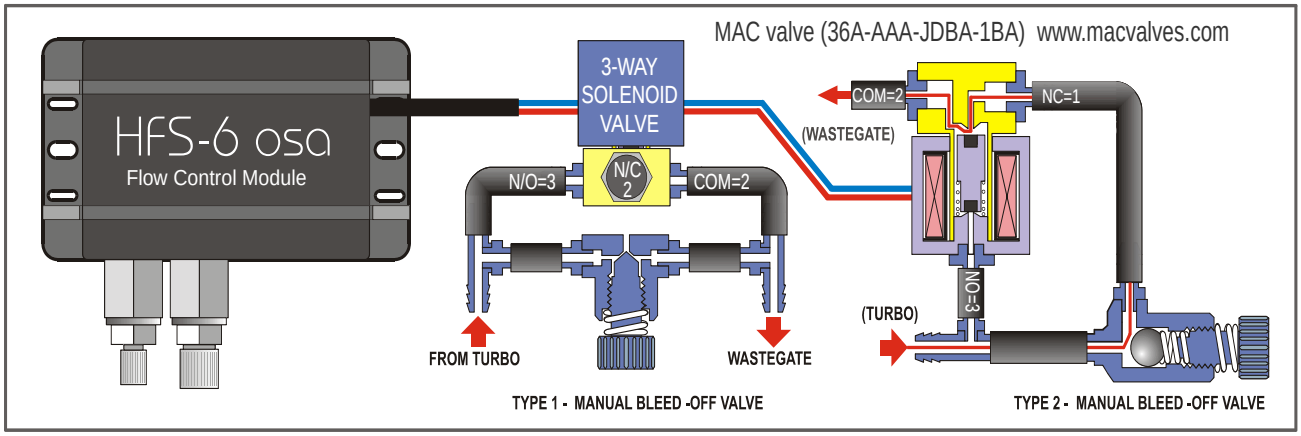
Figure below shows two common type of MBC (manual boost controller) used on most turbo cars.

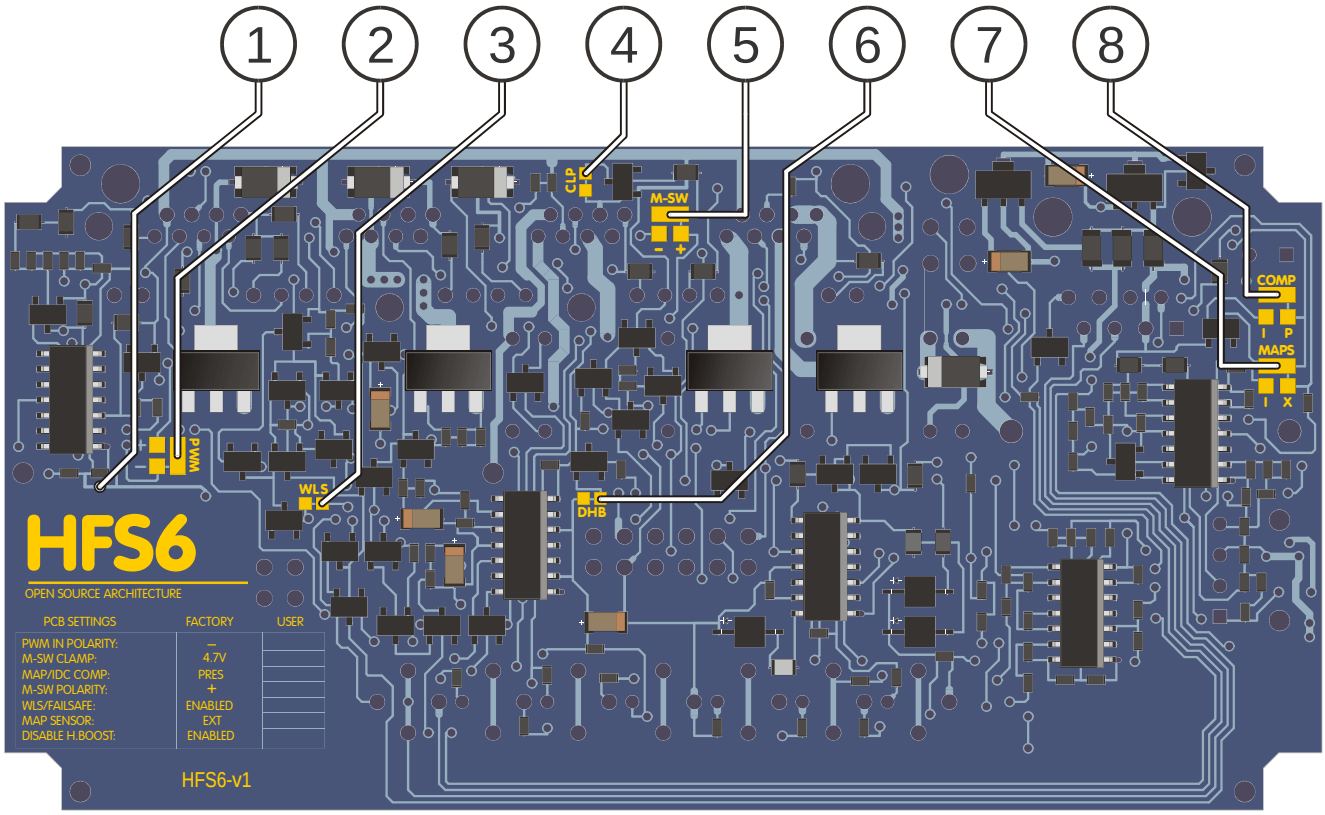
Type 1: pressure from the turbo to the wastegate is vented to the atmosphere via a restrictor and a vent. Boost increase is proportional to the amount vented.

Type 2: Boost increase is proportional to the spring pressure of the MBC.

When the solenoid valve is energised, pressure from the turbo is diverted to the wastegate directly. When MBC is by-passed, the boost pressure will drop down to wastegate setting.

NOTE:
The same MAC valve can be used to reduce boost on any Electronic Boost control valve system. Use the same hose configuration as the "TYPE 1", with Port 2 blocked-off. See figure below.





(Links are factory preset - no need to alter the setting unless customising)

The HFS-6 is pre-configured at the factory for general applications. If the user wishes to change the original setting, this is the section to explain it all. You will require a small tipped soldering iron and a small pointed tool. As seen from the PCB figure on the left. All the user configurable links are marked with numbered circles.

Some pads are pre-linked from factory. If you need to change those, pick off the thin track (pointed tool) and solder link the alternative solder pads.

1: FSI system compensation link (default=off)
Reserved for factory/FSI developer usages only.

2: PWM MODE polarity (default=negative switched)
To change the PWM detection polarity to positive, pick off the thin track and solder-link the "+" pad to the long pad.

3: WLS - Water Level Sensor (default=linked)
Pick off the thin circuit track if you do not wish the tank level sensor to disable the system after 10-20 seconds of low level reading. (not recommended),

4: CLP Clamping M-SW signal (default= 4.7V)
Solder linking this pin will clamp the above MSW signal from 7.5V to 4.7V, suitable for most digital devices. It is factory set to a clamped 4.7V.

5: M-SW polarity (default= positive until failure)
The factory default output is preset to give a 0V output upon a fail-safe activation. Otherwise the output will stay at ~4.7V.

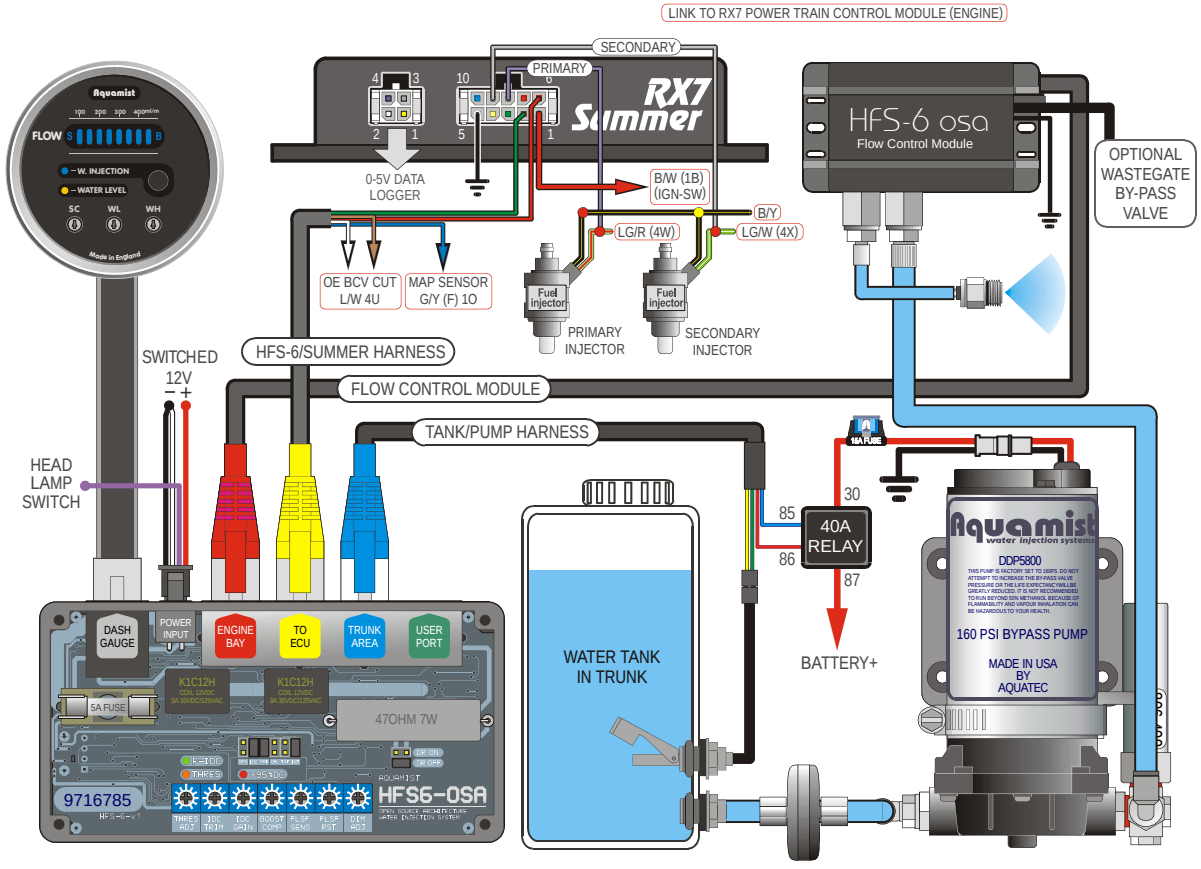
6: DHB - Disable High Boost (default=off)
Pick off the thin circuit track if you want to retain high boost or "Aggressive MAP" after the system is switched off at the gauge. Ensure you have race fuel in your tank. Yellow led will stay on as a reminded when gauge is switched off.

7: COMP IDC / PRESSURE - (default=P)
IDC is the main signal to meter flow from factory. If user wishes to use the MAP sensor as the main control signal, use IDC% for compensation. Alter the default link to "I" (IDC). Otherwise leave the link as it is

8: MAPS - Select MAP Signal source (default=X)
The HFS-6 is factory configured to read the pressure signal from an external source such as an ECU or third party MAP sensor. However, if this is not possible, the HFS-6 has an option of adding an internal 3-bar MAP sensor on the circuit board.

Please contact the factory for this option. You may need to return the controller to make this alteration.

HFS-6 + IDC SUMMER for RX7 WIRING DIAGRAM v1 5/4/09



In Car Dash Gauge (2M)

Pin	Colour	Size	Description	Electrical parameter
1	red	24awg	+12V power supply to gauge	250mA max@12v
2	green	24awg	Flow Sensor output voltage	0-5 VDC @10mA
3	pink	24awg	0V power supply to gauge	250mA max@12v
4	white	24awg	Internal communication signal	-
5	yellow	24awg	Float Sensor from water tank	Ground active
6	blue	24awg	Flow Sensor calibration output voltage	5-0 VDC @1mA
7	black	24awg	Night driving dimming connection	+12V active
8	brown	24awg	Wastegate bleed valve option (SW-)	1A @12V max.

Molex Microfit power harness (2 M): Main Power supply and Dimmer control

1	red	20awg	+12V Power supply (switched)	250mA max@12v
2	purple	20awg	Gauge Dimming input to head lamp switch	0-5 VDC @10mA
3	white	20awg	0V Ground (signal ground)	250mA max@12v
4	black	20awg	0V Ground (Power switching ground)	-1A @12V max.

Red Harness to Engine bay (2.5M): To Flow Control Module

1	red	24awg	+12V PSU to Flow control Module	1A max @12v
2	green	24awg	Flow Sensor Calibration Signal	5-0 VDC @10mA
3	pink	24awg	Wastegate By-pass valve option (+12V)	1A max@12v
4	white	24awg	Wastegate By-pass valve option (SW-)	1A max to Ground
5	yellow	24awg	Flow Sensor output signal	0-5 VDC @10mA
6	blue	24awg	Reserved for internal communication usage	Signal level digital
7	black	24awg	0V Ground (signal ground)	1A maximum
8	brown	24awg	PWM valve distribution signal	1A @12V max.

Yellow Harness to EMS (2.5M): IDC/Boost detection and Fail-Safe / Map-Switching interface

1	red	24awg	Ignition Switching detection	30mA max@12v
2	green	24awg	Fuel injection IDC detection	10mA max@12v
3	pink	24awg	Map switching interfacing	0, 5V, 7.5V @1mA
4	white	24awg	Failsafe Relay contact (COM, Wiper)	1A @24V max.
5	yellow	24awg	Reserved for internal communication	Signal level
6	blue	24awg	Map Sensor Signal for IDC compensation	0-5 VDC @1mA
7	black	24awg	Failsafe Relay contact (N/C contact) or DR	1A @24V max.
8	brown	24awg	Failsafe Relay contact (N/O contact)	1A @24V max.

Blue Harness to Trunk Area (6M):

1	red	24awg	+12V Power supply to 40A relay	0.5A max @12v
2	green	24awg	Water level sensor ground	signal ground 0.5A
3	pink	24awg	Reserved for Internal usage	----------
4	white	24awg	Reserved for Internal usage	----------
5	yellow	24awg	Water level sensor detection signal	Ground active
6	blue	24awg	switch ground to 40A relay	12VDC @0.5A
7	black	24awg	Reserved for Internal usage	----------
8	brown	24awg	Reserved for Internal usage	----------
- - - - - - - - - - - - - - - - -				
9	Red	12awg	12V Power cable to water pump relay	38A @12V max.
10	Black	12awg	0v ground for water pump	38A @12V max

GUARANTEE

ERL guarantees, at our option, to replace faulty goods supplied or repair the same, subject to the claim made in writing to us within 12 months after the sale by us, or for such other period as may be indicated by us for specific products in lieu of any warranty or condition implied by law as to the quality or fitness for any particular purpose of the goods.

Any claim against us must be made to us in writing within the period of 12 months after the sale by us , or our agents, or our distributors of goods in question (or such other period as may be indicated by us) and any goods to which the claim relates must be returned to us within that period suitably packaged and cleaned and, with any particular instructions which we may have notified to you at the time of supply. Original invoice, the nature of any claimed defect must accompany the goods in question prior to despatch to us.

If these requirements are not complied with our Guarantee shall not apply and we shall be discharged from all liability arising from the supply of defective goods.

LIABILITY

We shall not be under any liability whether in contract, or tort or otherwise and whether or not resulting from our negligence or that of our employees, in respect of defects in goods supplied or for any damage or loss resulting from such defects.

We shall not be under any liability for damage, loss of expense resulting from failures to give advice or information or giving the incorrect advice or information whether or not due to our negligence or that of our employees.

In no event shall any breach of contract on our part or tort (including negligence) or failure of any time on our part that of our employee give rise to liability for loss of revenue or consequential loss or damages arising from any cause whatsoever.

Note: ERL reserves the right to make changes to our products without notice in order to improve design performance and reliability.

Useful Aquamist technical links

Aquamist owners have been pretty good in supporting each other. Most experienced users will help new users with questions, not necessary to email or make long distance phone calls and wait on hold to get help. Here are a list of clickable forum links where users can seek help and advice from others:

- *http://www.waterinjection.info (general)*
- *http://forums.nasioc.com/forums/forumdisplay.php?f=145 (Subaru)*
- *http://www.iwsti.com/forums/water-meth-injection-nitrous-intercooler-cooling/ (Subaru:sti)*
- *http://forums.evolutionm.net/water-alcohol-injection-nos-173/ (Mitsubishi evos)*
- *http://www.rx7club.com/forumdisplay.php?f=173 (RX7)*